BATTLE COMMAND: TACTICAL DECISION-MAKING IN THE INFORMATION AGE

A MONOGRAPH
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Abstract

BATTLE COMMAND: TACTICAL DECISION-MAKING IN THE INFORMATION AGE by MAJ W. Russell Hall, USA, 56 pages.

The monograph discusses the Army's adoption of information technology to support its Force XXI concept. The central question is: Will the adoption of emerging information technology improve a commander's ability to exercise battle command in future operations. Battle command represents a central theme in emerging US Army doctrine. It links information technology with how the Army intends to conduct operations in the future.

The monograph first examines the dynamic world environment and that predicted for the future to understand the conditions under which commanders will operate in the future. It then examines the Force XXI concept to draw the connection between the this environment and how the Army is evolving to remain a capable force in the future.

The monograph then analyzes battle command and determines the critical battle command characteristics. It examines the accepted definition and other areas to include command methods and the concept of a shared vision. The analysis aids in the development of criteria in which to evaluate a battle command system that supports the commander. The monograph then examines the Army Battle Command System under development using these criteria. Finally, the monograph suggests alternative approaches to enhance a commander's ability to exercise battle command.

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> No single communications or data processing technology, no single system of organization, no single procedure or method, is in itself sufficient to guarantee the success or even adequate conduct of command in war.[1]
>
> van Creveld

I. Introduction.

Former Army Chief of Staff, General (GEN) Gordon R. Sullivan, postulated that the future will be unstable and unpredictable. Several factors characterize this instability in the military environment. The United States (US) National Security environment is very dynamic. Modern military forces have become increasingly sophisticated. Technology, especially information technology, is advancing at a very rapid rate. To cope with this potential future, GEN Sullivan directed the Army to exploit "advances in information technology to raise our readiness to respond to unstable situations throughout the world."[2] Based on this direction, the Army developed a process called Force XXI to redesign the Army based on information technologies to meet the needs of the US in the 21st Century.

Adopting information-age technology may give Army commanders a decisive advantage during future operations in such a dynamic environment. The idea is that if the US military can exploit this technology area and gain information dominance over the enemy, then Army commanders can control the tempo of operations and shape the battlefield to defeat decisively an enemy or successfully conduct noncombat operations. As part of the Force XXI process to experiment with emerging doctrine and technology, the Army must always view the validity of this effort through the eyes of a commander. This approach suggests one fundamental guiding question. Will the adoption of

emerging information technology improve a commander's ability to exercise battle command in future operations? The monograph will attempt to answer the question. However, the Army must continually ask the question, and others, as part of the process of change. By doing so, the author believes the Army will be a true learning organization and continue to provide soldiers with the best doctrine and equipment to accomplish national objectives.

Unlike civilian organizations, the US military normally does not simply buy new technology and use it for operational purposes. The military applies a technological advance in conjunction with changes in doctrine, training, leadership development, organization, and materiel to create a military innovation. Military innovation begins with a change in how the Army thinks about conducting operations. For the Army, doctrine is "a statement of how it, as a part of a joint team, intends to conduct war and operations other than war."[3] The Army's Force XXI effort represents an attempt to answer GEN Sullivan's call to investigate information technology as a potential military innovation. Thus, US Army Training and Doctrine Command (TRADOC) Pamphlet 525-5, Force XXI Operations, represents the first step of the "doctrinal journey into the future."[4] It serves as both a potential look into the future and a benchmark to measure progress. As GEN Franks, the former commander of the Army's Training and Doctrine Command (TRADOC) reminds us, doctrine is the Army's engine of change.[5]

As part of the Force XXI concept, battle command represents both current doctrine and an important emerging doctrinal concept for experimentation. Battle

command is the central doctrinal concept that links information technology with how the Army intends to conduct operations.

As a doctrinal genesis for potential military innovation, one could theoretically analyze battle command from several perspectives. Typically, the Army analyzes issues according to how they impact on doctrine, training, leader development, organization, and, materiel (DTLOMS). Clearly battle command influences all of these areas. However, an all encompassing analysis exceeds the scope of this monograph. Arguably, analysis of any one of these alone could fill volumes.

The Army believes command is both an art and a science. Much of the art of command is individual specific and deals with various aspects of leadership, such as motivation. The Army has successfully relied on the individual leadership abilities of its commanders for over 200 years. Emerging battle command concepts suggest that the Army will not significantly change how it views or trains commanders from the leadership perspective. Therefore, the author takes a very narrow perspective and will focus on the science of command. He focuses on battle command as a process that uses information to coordinate organizations to accomplish a task or mission.[6] This allows the monograph to evaluate the integration of information technologies to support the decision-making side of the battle command concept only. In short, he attempts to evaluate the science of the emerging doctrinal concept with the materiel the Army is developing to implement it.

With that disclaimer, the monograph will answer the question posed in the following way. First, it will address the factors that influence military innovation to

explain the Army's current direction. Next, it will present a broad overview of Force XXI Operations and a more in-depth examination of battle command and the other battle dynamics. From the battle command analysis, the monograph will identify the critical characteristics of battle command. The derived characteristics will serve as criteria to evaluate a battle command system. Then the study will describe the Army Battle Command System (ABCS) and its Maneuver Control System (MCS) component. Using the information presented to this point, the monograph will then attempt to determine if MCS capabilities will meet the needs of commanders and enhance their ability to exercise the battle command concept. Based on the conclusions drawn from this analysis, the author will then present recommendations if warranted. Finally, the author will summarize the findings and recommendations as appropriate.

II. Understanding the Environment

The first step in answering the research question is to understand why the Army chose to focus on information technology as a potential military innovation. Traditionally, five factors can point to the need for military innovation. These factors include: 1)changes in the threat or unknown dangers; 2) changes in the nature of warfare; 3) technological advances applicable to militaries; 4) history and lessons learned from it; and 5) national objectives. General Frederick Franks, the former commander of TRADOC, believes that all five of these factors now point to the need for military innovation.[7]

With the dissolution of the Warsaw Pact, the United States no longer has one major threat to focus its attention. It now faces an uncertain multipolar world rather than

the fairly stable bipolar Cold War era. Potential threats range from large regional competitors, such as North Korea, to small terrorist organizations, such as those that attacked US forces in Saudi Arabia. While many potential threats to US security use equipment from the former Soviet Union, they do not all use Soviet doctrine of which the US Army is very familiar. This situation forces commanders to prepare for a wide variety of threats across the spectrum of conflict.

Today, the US military is deployed around the world conducting a variety of missions. Previously, the Army primarily focused on the defense of western Europe against large armored formations. The Army's current doctrine, Field Manual (FM) 100-5 (1993 version) stresses the need to conduct operations across the entire spectrum of conflict. This includes full-scale combat operations down to noncombat operations such as disaster assistance. Preparation for and the conduct of operations across this spectrum requires accurate and timely information.

Information technologies such as the microprocessor and associated storage media linked by global telecommunications means continue to advance rapidly. Weapons technology also continues to make major advances, such as the long-range precision guided weapons and sensor systems used in OPERATION DESERT STORM. The advances to date may only hint at the future. Information technology alone is expected to advance a thousand fold in the next 20 years.[8] Thus militaries can only become more sophisticated in the future. As Martin van Crevald points out, as military forces become more sophisticated, the role of command also increases. He describes the history of command as "an endless search for certainty" that manifests itself as a race

between information demand and the ability of command systems to meet that demand."[9] Technology, especially information technology, will play an ever increasing role in military innovation.

Arguably, threats to US security have historically evolved over a period of time. For example, the Army has had units stationed in Korea for over 45 years. Therefore, the military could study potential conflicts and adapt to some degree before committing forces in combat. Today, the nation calls upon the military to react to various situations with minimal warning. To ensure success, the military must quickly apply lessons learned to a current situation. This requires rapid analysis of large amounts of data and quick dissemination of relevant information to commanders in the field.

National objectives have changed. Previously, the US sought to deter the spread of communism. Today, the US promulgates a strategy of engagement and enlargement where the US supports the spread of democracy and a global economy. This further contributes to a wider range of operations that US forces must prepare to conduct in the future against a very wide range of potential threats. Additionally, the US has committed itself to coalition type operations versus unilateral actions. Successful support of these national objectives will often require the expeditious acquisition and dissemination of information.

In summary, these factors describe a dynamic global environment where the US continues to play an increasing role. This role includes combat operations such as Operation DESERT STORM and a variety of noncombat operations such as UPHOLD DEMOCRACY in Haiti and PROVIDE COMFORT in northern IRAQ. These diverse

roles resulted from a change in the US threat and evolving national and military strategies. Rapid technological advances suggest that emerging information technology can help commanders acquire and process critical information faster. Similarly, the Army must apply the lessons learned from current and previous operations more thoroughly and faster to achieve it objectives and to guide future development.

The common thread that links these factors is the ever increasing need for information. What differentiates current and projected Army operations from those of the past then is the scope, intensity, and tempo of the operations that result from increases in weapons lethality, range, and precision coupled with timely and accurate information requirements.[10] Commanders require this information to understand rapidly the situation and make decisions that will ensure successful action. Therefore, the Army has decided to leverage information technology to aid the commander in this dynamic environment. Furthermore, information plays a central role in the Force XXI concept. This information enables commanders to understand the situation and make decisions and explains why battle command plays such a central role in the Force XXI concept.

As the Army asks commanders to do more, sometimes with less, the Army also recognizes the need to provide the commander with greater access to information and the ability to share it. Through the development of doctrinal concepts, the Army can focus technological efforts. Military innovation results then from the recognition of potential improvements in the implementation of doctrine.

III. US Army Force XXI Operations

The Army recognizes the impact of the factors addressed above. These factors signal the need for doctrinal and organizational change to operate successfully in a dynamic environment. The 1994 US Army Training and Doctrine Command (TRADOC) Pamphlet 525-5, Force XXI Operations, represents the Army's attempt to investigate and understand how it must change to continue to meet its strategic requirements in the future. As such, the Army views Force XXI as a conceptual process to ensure the 21st Century Army can effectively perform across the full spectrum of operational environments. The basic charter for Force XXI is to:

> design organizations and develop capabilities that will allow it (the Army) to be rapidly tailorable, rapidly expansible, strategically deployable, and effectively employable as part of a joint and multinational team to achieve decisive results in future War and Operations Other than War (OOTW) in all operational environments.[11]

Based on its analysis of the future strategic environment, the Army further defines Force XXI by five characteristics required to meet the basic charter. These characteristics are doctrinal flexibility, strategic mobility, tailorability and modularity, joint and multinational connectivity, and the versatility to function in War and OOTW.[12]

The Force XXI characteristics, based on the potential strategic environment, along with lessons learned from the past, provide a potential look at the nature of future warfare for the US Army. Based on this interpretation of the future, doctrinal flexibility represents the key Force XXI characteristic. In recognition of this, TRADOC developed the battle dynamics framework to describe potential doctrinal change. The battle

dynamics represent emerging doctrinal concepts. They are battle command, battle space, depth and simultaneous attack, early entry, and combat service support. Together, they provide a framework to describe change and serve as a benchmark for experimentation.[13] Within this framework, the critical component of the Army's vision is the realization that the "acquisition, processing, and rapid sharing of information revolutionizes the conduct and tempo of operations."[14] Figure 1 represents the author's interpretation of the Force XXI concept.[15]

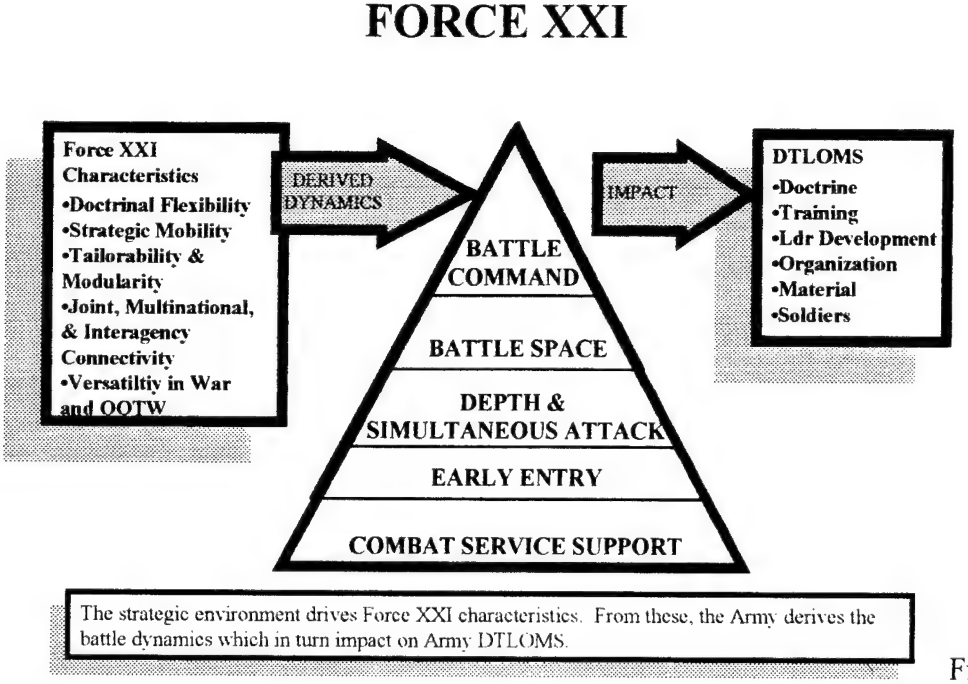

Figure 1.

Viewed collectively, the battle dynamics represent the interaction of the components of combat power. FM 100-5 defines combat power as the ability to focus sufficient force to ensure success and deny the enemy any chance of escape or retaliation. The dynamics of combat power are maneuver, firepower, protection, and leadership. Leaders integrate the capabilities of the other elements in an appropriate combination to

the fit situation.[16] Battle command represents the leadership function that serves to integrate the others.

A closer look then at the battle dynamics will provide a mental model of how the Army envisions it will fight in the 21st Century. Through an understanding of the interrelationship between the battle dynamics and the influence of information technology on them, both singularly and collectively, we can gain an appreciation for the central importance of battle command and the requirements for any proposed command system that will aid the commander in implementing battle command.

Battle Command

The 1993 version of FM 100-5, Operations, introduced the term battle command. As GEN Franks points out, the term is not new. It merely replaced what the Army previously called command and control (C^2). The Army wanted to place more emphasis on the art of command and less on the control.[17] TRADOC Pamphlet 525-5, Force XXI Operations, defines battle command as:

> the art of decision making, leading, and motivating soldiers and their organizations into action to accomplish the mission: (*Battle command*) includes visualizing current state and future state, then formulating concepts of operations to get from one to another at least cost; also includes assigning missions, prioritizing and allocating resources, selecting the critical time and place to act, and knowing how and when to make adjustments during the fight.[18]

Simply stated, the battle commander leads and directs units to accomplish a specific mission. The TRADOC definition also states specific tasks that the Army expects commanders to accomplish, such as assigning missions or selecting the critical

time and place. The tasks are inherent in the process the commander uses to coordinate the actions of his subordinates.

Battle Space

The maximum capabilities of friendly and enemy forces to acquire and dominate each other by fires, maneuver, and in the electromagnetic spectrum determine battle space. It requires a commander to visualize the area of operations and how forces can interact within it.[19] Battle space serves as a framework for commanders to view potential missions and develop a vision to dominate the enemy and protect his own force.[20] In many ways, battle space represents the modern version of the old acronym METT-T (mission, enemy, terrain, troops, and time). Perhaps GEN Funk says it best:

> A tool for all levels of command, from squad leader to corps commander, battle space offers a holistic look at fighting an effective fight. It is a way to think about fighting -- a visualization by commanders at all levels of the entire battlefield and all phases of the campaign and operation.[21]

The battle space dynamic supports battle command. The commander uses this tool to visualize the current state and future state. Then, based on his knowledge of friendly forces and the enemy, the commander can develop the course of action to achieve the desired future state. Emerging doctrine calls this process battlefield visualization and identifies it as a critical component of battle command.[22]

Depth and Simultaneous Attack

Force XXI doctrine defines the dynamic of depth and simultaneous attack as the simultaneous application of combat power against an enemy throughout the depth of the battlefield.[23] Theoretically, a commander visualizes the battlefield and establishes the

battle space. The commander then seeks to dominate the enemy by attacking him simultaneously throughout the depth of the battle space to accelerate his defeat. The ability to accomplish this requires detailed information about the battle space.

Early Entry

The change in military strategy from a forward-deployed Army to a force-projection Army establishes the relevance of this dynamic. Based on his knowledge of the battle space, a commander will tailor his forces to conduct the specific operations required. He chooses lethal and survivable units that can deploy as rapidly as the situation requires, enter the operational area, secure the lodgment, and either conduct decisive operations or establish the conditions for follow-on forces to do so.[24]

Combat Service Support

Both the Force XXI characteristics and the implied and specified requirements of the other battle dynamics drive this battle dynamic. The Force XXI concept requires a versatile, deployable, modular, and expansible logistics system. Logistics includes both the deployed logistics force and the sustainment base. The holistic purpose of this dynamic is to "support mobilization, deployment, reception and movement, sustainment, reconstitution, redeployment, and demobilization of military forces."[25] Like early entry and follow-on forces, commanders will tailor combat service support to meet the requirements of the mission.

The role of the commander is important in each of the battle dynamics. The commander visualizes the battlespace, determines courses of action, tailors the force required including combat service support. He establishes the rythm for the operation.

IV. The Emerging Battle Command Concept

With a greater understanding of the Force XXI concept, the analysis will now focus on the battle command concept in an attempt to ultimately develop battle command system criteria. This development requires an in-depth analysis of the basic definition and other sources such as the other battle dynamics, related Force XXI concepts, and other command-related literature. The analysis begins with a more thorough discussion of the characteristics presented in the TRADOC definition. It will define these characteristics based on the basic knowledge of Force XXI concepts discussed above.

In the discussion of these characteristics, it is important to remember the overall assumptions emerging doctrine associates with the battle command system. The Force XXI concept assumes that the objective battle command system will provide more timely and accurate information to the commander. It will provide the ability to collect, process, disseminate and display information in an environment that is greater in scope, intensity, and tempo than today.[26] Again, this results from the increase in lethality, precision, and range of modern weapons provided by information age systems and sensors.[27] These assumptions influence how the Army believes information technology has changed each characteristic.

The basic definition and related emerging doctrine specify several key characteristics of battle command that will require the adoption of information technology or become easier to perform using it.[28] These include:

- Visualize The Current State
- Visualize The Desired Future State
- Decide How To Get From One To The Other
- Assign Missions

- Prioritize And Allocating Resources
- Select The Critical Time And Place To Act
- Know How And When To Make Adjustments To The Current Fight
- Lead From The Front

At this point, the author must also reiterate that the focus of this effort is to establish what tools, resident in the objective system, a competent commander needs to exercise battle command. The following analysis of the characteristics of battle command will discuss some of the products these tools should provide.

Visualize The Current State

The commander must see and understand everything within his battle space. This is part of the Force XXI battlefield visualization concept. It is a continuous process that the commander and his staff perform to develop and maintain a clear understanding of the current state of his forces in relation to the enemy and the environment.[29] Inherent in this process is gaining and maintaining what the Army calls situational awareness. It represents the ability to have accurate and real-time information of friendly, enemy, neutral, and noncombatant locations. It is a common, relevant picture of the battlefield scaled to a specific level of interest and special needs.[30]

Visualize The Desired Future State

Battlefield visualization also includes seeing or conceptualizing friendly forces, the enemy and the environment at the desired future state. Typically, the future state represents mission accomplishment. This characteristic requires the commander to decide what he wants the future battle space to look like. To do so, the commander must fully understand the friendly and enemy capabilities and the effects of terrain and

fully understand the friendly and enemy capabilities and the effects of terrain and weather, for example. In essence, he creates a common, relevant picture of the future.

Deciding How To Get From One To The Other

After the commander visualizes the desired future state, he must visualize the sequence of actions that will enable the friendly force to move from the current state to the future state.[31] It implies that the commander must visualize his battle space from the current state to the future desired state. In essence, this is what the Army currently calls the Tactical Decision-Making Process (TDMP). The TDMP represents both art and science. Movement rates, consumption rates, and weapon system capabilities, for example, dictate what units can and cannot do. They represent part of the science. Other tasks in the TDMP such as course of action (COA) analysis and comparison mainly fall under the realm of military art. However, even current computer systems and software can make these tasks easier and quicker to perform. Therefore, a useful battle command system must provide the commander with information technology tools and associated products to accomplish the TDMP, or some future version of it.

Assigning Missions

Once a commander has developed a COA, he assigns missions to subordinate elements. This characteristic incorporates aspects of battle space and depth and simultaneous attack. Through his knowledge of the maximum capabilities of both friendly and enemy forces the commander selects the appropriate unit to accomplish each mission required to achieve the future desired state.

Prioritizing And Allocating Resources

Once the commander selects a COA and assigns missions to his subordinates to achieve the desired end state, he must prioritize and allocate resources. This allows the subordinates to complete the tasks assigned. Resources include much more than just logistics, although that is very important. It includes all the combat service and combat service support assets. The commander ensures each unit has the assets to accomplish the missions assigned. Therefore, he must have access to detailed unit status reports that indicate such things as the supply, maintenance, personnel, and weapons systems status.

Select The Critical Time And Place To Act

An essential part of emerging Force XXI doctrine is the concept of controlling the tempo of operations. The Army views tempo as "the measure of time between, and the sustained frequency of, militarily significant events."[32] Controlling tempo suggests that a commander does not have to overwhelm the enemy with the speed of events, but suggests that by controlling the pace of the events he can maintain the initiative over the enemy. Therefore, the effect he desires to achieve drives the selection of the critical time and place to act. This selection is part of the sequence of events that the commander takes to get from the current state to the future state. He times the activities to maintain the initiative and force the enemy to react and ultimately to capitulate. This characteristic requires detailed time, distance, and capability analysis, as well as perpetual situational awareness throughout the operation.

Know How And When To Make Adjustments To The Current Fight

This requires the commander to maintain a visualization of both the current situation as it evolves and the desired end state. The commander and his staff must track the critical actions and information required to achieve the desired state. Examples include the enemy situation, weather, friendly unit locations, logistics status, and even unit morale. Currently, commander's develop Commander's Critical Information Requirements (CCIR) as part of their decision-making process. CCIRs represent unknown information requirements that when they become known will have a direct impact on the operation. They include needed information about the enemy, Priority Intelligence Requirements (PIR), and a commander's own forces, Friendly Forces Information Requirements (FFIR). It also includes information that the commander does not want the enemy to know, Essential Elements of Friendly Information (EEFI).[33] In summary, a battle command system must allow the command to monitor the current situation in near-real time, compare it to the desired end state, and assess when or if he should make adjustments. It must also provide rapid transmission of CCIR as the situation develops.

Lead From The Front

Simply stated, a commander must be able to command from anywhere on the battlefield. A battle command system must allow the commander to go to a point on the battlefield where he can observe and influence the current operation without extracting himself from the overall command process.

Definition Summary

Some of the battle command characteristics explored above are dependent upon each other. They create a distinct process. For example, a commander's decision to make adjustments to the current fight requires an accurate relevant, common picture of current state. Visualization of the desired future state drives the COA selected. Therefore, it makes sense to aggregate some of the characteristics. The following represents the battle command system criteria derived from the basic definition:

- Visualize The Current State
  -- Know How And When To Make Adjustments To The Current Fight
  -- Track the CCIR
- Visualize The Desired Future State
- Decide How To Get From One To The Other
  -- Assign Missions
  -- Prioritize And Allocating Resourses
  -- Select The Critical Time And Place To Act
  -- Develop CCIR
- Lead From The Front

This above discussion provides a basic understanding of the emerging battle command concept. However, this only serves as a starting point toward understanding battle command well enough to complete the develop battle command system criteria. The monograph will now expand the search and attempt to redefine battle command then complete the development of the system criteria.

V. Battle Command Redefined

> You can't see an infantry squad -- it is an idea that exists only when jointly held by its members.[34]
>
> DePuy

Theoretically, you could develop battle command system criteria from the TRADOC definition. However, battle command is a much more complex concept than the definition suggests. The author believes the definition misses the mark from two perspectives. First, it fails to recognize that commanders inherently select some type of control methodology to ensure accomplishment of the mission. Second, it fails to view command as a two-way street. Both current and emerging doctrine discuss the importance of a shared vision. Shared vision helps synchronize the various subordinate and supporting units and creates a synergistic effect. Therefore, the development of battle command criteria requires a more comprehensive definition of the concept.

Using the basic definition as a starting point, battle command has basic three elements: decision-making, leading, and controlling in operations.[35] As previously stated, this monograph focuses on the science of battle command. However, the author acknowledges that individual and doctrinal styles influence the science of the subject. While this monograph must largely ignore the leadership aspects of battle command using this approach, it cannot ignore various decision-making and controlling methodologies. In fact, the study and analysis of these methodologies, especially control methodologies, better defines battle command. For example, the degree of control that a commander uses affects other characteristics of battle command. Also, the more control he assumes the more decisions he will make vice his subordinates. However, this monograph will not explain in great detail or pass judgment on the various control methodologies. Numerous recent articles and monographs address this subject in much

greater detail than space allows here. This monograph will highlight instead how control methodologies could affect the Force XXI objective battle command system.

To understand control methodologies requires an understanding of the relationship between command and control. First, remember the earlier quotation from GEN Franks, who said that battle command merely places more emphasis on command than control. Notice he did not say it totally replaces control. The word control still appears next to battle command in Army doctrine. But what is control?

Control has several accepted definitions. Here are some examples. Control is: 1) the means by which a commander exercises authority; or 2) a process that ensures the execution of a commander's decisions. These examples imply that the commander imposes control, like command, over his subordinates. Control can also represent feedback. If command is the exercise of authority, then control is the returning flow of information about the current situation. In this case, greater control (feedback) provides the commander with more information to base a decision upon.[36]

Current Army doctrine provides the following definition of control. "Authority which may be less than full command exercised by a commander over part of the activities of subordinates or other organizations."[37] This definition implies that staffs cannot exercise control authority, unless the commander delegates it to them. Therefore, you cannot separate command and control completely. While the commander may delegate some control to the staff, he still remains responsible and can withdraw that delegation at any time. Just as important, the commander determines how much control he exercises over subordinates.

Historically, commanders and militaries have adopted command methodologies that cover what we will call the "spectrum of command and control".[38] This spectrum has two extremes. On one end, a commander can give very detailed instructions to his subordinates and closely monitor their performance. This is detailed-order control and it fits within the basic TRADOC definition. On the other extreme, a commander can give very broad direction to a subordinate and monitor progress only by exception. This is directive-order control and it also fits within the definition. The point here is that command methodology varies. It can vary from detailed-order control to directive-order control, as outlined by Simpkin on the tight-rein to loose-rein axis in his parameters of command model.[39] The Army views these extremes as either centralized or decentralized. The degree of centralization represents how much control the commander exercises.

The degree of control a commander chooses to exercise influences the amount of information that must flow through the command system. The higher the degree of control the commander exercises the more information he requires. It influences a commander's decision-making process and the amount of decisions he will make. It also influences the commander's location on the battlefield. For example, Simpkin describes a method of control he calls forward command. Using the forward command method, a commander observes an operation directly and may actually assume command of the subordinate unit.[40] The objective command system we seek to define then must accommodate the full spectrum of command and control to fulfill the needs of individual commanders. Further analysis will either support or refute this hypothesis.

The Force XXI concept specifies that the objective battle command system will provide more timely and accurate information to the commander. It will provide the ability to collect, process, disseminate and display information in an environment that is greater in scope, intensity, and tempo than today.[41] Again, this results from the increase in lethality, precision, and range of modern weapons provided by information age systems and sensors.[42] The amount of information desired coupled with increases in technology as noted here suggest that battle command may primarily utilize more detailed control. This would make it a more centralized type of system.

There is even some debate today in the Army as to whether or not the application of information technology with battle command will foster micromanagement. Instead of commander's hovering above each other in helicopters "assisting" the platoon leader on the ground as in Vietnam, some believe that commanders may again focus their attention on platoons using computer screens. Interestingly, Simpkin believes that the former Soviet Army evolved to a similar state. He called this "detailed-order tactics by rear command." He notes that sophisticated communications from battalion to army level allowed the Soviet army level commander to move individual tanks on the battlefield using a television and a computer terminal.[43]

Some believe the opposite perspective. They see commanders overwhelmed by information. This forces the commander to allow leaders at the lowest levels to make decisions. The 1993 version of FM 100-5 also supports a less centralized view. It states, "In battle, battle command requires the decentralization of decision authority to the lowest practical level."[44]

Emerging doctrine states that the simultaneity of command methodologies will exist within Force XXI operations. Commanders may use both centralized and decentralized control to decide then execute actions at a tempo the enemy cannot match.[45] Should doctrine be so equivocal? Returning to Simpkin's theory of the parameters of command, he believes that positional warfare associated with attrition theory requires more centralized control. On the other hand, dynamic warfare associated with maneuver theory implies more decentralized control.[46] Emerging US Marine Corps doctrine on command and control stresses similar theories to Simpkin's.[47] If emerging Army doctrine will use both theories of warfare, then maybe it should be equivocal.

The depth and simultaneous attack dynamic provides a good example of how this can apply in the Force XXI concept. Theoretically, if all the weapons of a division fired simultaneously at an enemy corps throughout his depth, the division could defeat the enemy quickly.[48] A commander may use very centralized control to position forces on the battlefield to occupy specific terrain at a certain time to halt the enemy's advance. At the same time, the commander, using more decentralized means could maneuver the remainder of his forces to strike specific units of the enemy corps throughout its depth. In one case the commander tells a subordinate to go here, at this time, and do this. This exemplifies more detailed control. In the other case, the commander simply directs a unit to destroy an enemy formation. This is clearly more directive or general in nature and allows greater freedom of initiative from the subordinate.

With this understanding of control methodologies, what does it begin to tell us about battle command as an emerging concept and therefore the battle command system

that will support it? To help answer this question, we will use a vignette based on the previous example where the division attempts to defeat the enemy corps using depth and simultaneous attack.

The commander has very detailed information about the lead elements of the corps. Therefore, he assigns a brigade the mission to block the lead regiments advance. The more specific information he has, the more likely he is to choose a more centralized method of control. A battle command system that adequately transmits a great deal of information and has detailed analytical and support tools allows the commander to quickly assess the situation and make these types of decisions. He can better select the critical time and place to act. He can assign very specific tasks to subordinates and provide them with the appropriate resources.

The commander does not have specific information about the remaining divisions of the corps. When a commander does not have detailed information about the situation, he will use a more decentralized method of control in an attempt to obtain more information. He may then task another brigade to maneuver around the flank of the blocking force to locate and attack the second echelon divisions. Similarly, he may hold his most valuable weapon systems, such as long-range artillery, under very tight control until he locates the highest payoff targets.

This example demonstrates one way that a Force XXI commander could use both methods, even in the same battle. Since the TRADOC battle command definition applies across the spectrum of command and control, is there a common thread that exists across this spectrum? In the dynamic environment described above, the author believes the

answer lies in the development of a shared vision among all the subordinate and supporting units. When everyone fully understands the tasks they must perform and the purpose each task serves in the overall concept, then the better synchronized the overall mission becomes. In a rapid, complex operation like the one described above, the commander cannot control every critical piece all the time.

GEN DePuy alludes to the requirement for shared vision in the quotation at the beginning of this section. Eleven men serving as an infantry squad are most effective when they work together. They work together effectively when they are both well led and have a shared vision of the course of action in enough detail for each member to understand his actions in the task. Specifically, GEN DePuy stated:

> The commander of a squad is constantly faced with two supremely important tasks: *First*, he must decide on a course of squad action which will achieve his objectives, and *second, he must organize his squad around a jointly held image of this course of action in sufficient detail to provide adequate instructions for each squad member.*[49]

GEN DePuy's description of the commander's supreme tasks closely resembles that of van Creveld's view of command in his work, Command in War.[50] The TRADOC definition misses the emphasis on the "jointly held image" (DePuy) or the need to "coordinate people" (van Creveld). Ironically, other aspects of Force XXI doctrine, as does most of the current Army doctrine, address the need for shared vision and understanding. More complex, dynamic situations like those addressed in Force XXI concepts require it. Therefore, the definition forces you to search beyond the stated definition and develop your own mental model of battle command as a doctrinal concept.

As a fundamental principle, the author believes the Army should correct the definition. Arguably, the pieces already exist in doctrinal form. The Army talks about shared vision in the case of the commander's intent. Additionally, the Army writes its mission statements with both a task and purpose. Typically, the purpose helps explain why the unit performs the task and how it fits in the scheme of the next higher commander. Therefore, the author proposes the following definition of battle command:

> the art of decision making, leading, and motivating soldiers and their organizations into action to accomplish the mission through a shared vision of the tasks and purpose of each organization involved: (Battle command) includes developing and sharing a common, relevant picture of the current state and the desired future state, then formulating concepts of operations to get from one to another at least cost; also includes assigning missions, prioritizing and allocating resources, selecting the critical time and place to act, and knowing how and when to make adjustments during the fight.

The author believes that these components already exist in the Army's current and emerging concepts of battle command. From the above analysis and resultant definition, the following concepts become additional battle command system criteria.

Communicate Rapidly a Shared Vision of the Future Battle Space

Once the commander has completed the decision-making process, he must rapidly communicate his concept of the operation and commander's intent to his subordinates and those elements that support him. The commander's concept and intent must be shared by all units involved for them to execute the mission in harmony with each other. TRADOC Pam 525-5 already states this difficult task is requirement.[51] The concept of harmonious execution of a mission is what the Army today calls BOS synchronization.

Seamless Interaction between the Battlefield Operating Systems

Current Army systems tend to operate in a very stove-piped fashion. Each BOS element communicates fairly well vertically within that BOS but not very well with the other BOS elements. For example, maneuver units must currently request field artillery support by voice communications vertically through the maneuver unit's chain of command. However, the maneuver unit headquarters then must approve the request and then pass this information to the appropriate fire support unit. The fire support unit then enters the request into their digital TACFIRE system. Emerging systems such as the M1A2 tank can now pass the request digitally. Ideally, all units will pass information both vertically and horizontally across a digital communications network in the future.

The above discussion demonstrates the complexity of battle command. It involves leadership, visualization, and decision-making. It is a continuous process of planning, deciding, and executing. Control is also an inherent part of battle command. The method a commander uses to make decisions and the type of orders he issues exemplify the amount of control he retains. Analysis of the Force XXI concept shows that commanders will probably use both centralized and decentralized command methods. In either case, the commander must issue orders quickly. He will also attempt to communicate rapidly a shared vision of the operation. The interconnectivity between the commander and everyone involved in an operation enhances battle command through the development and maintenance of common situational awareness. Therefore, battle command requires the communication of a shared vision and all the BOS elements to interact seamlessly in addition to the characteristics stated in the TRADOC definition.

The above battle command analysis provides a good understanding of the concept. It also establishes the relevant characteristics the monograph requires to evaluation the battle command system.

VI. Current Battle Command Implications

Before the criteria analysis is complete, recall GEN Franks' comment that the emphasis of battle command is on command. As he points out in his battle command article, the Force XXI process bases much of the preparation for the future on where the Army is today.[52] It is an evolutionary process. Therefore, it is appropriate to look at how well the Army's commanders execute battle command today. In fact, the Army recently conducted such a study at its combat training centers, such as the National Training Center (NTC) at Fort Irwin, California.

The Battle Focused Rotation Program

In 1993, the Commanding General of TRADOC tasked the Army's Battle Command Battle Laboratory (BCBL) to initiate a Battle Command Focused Rotation (BCFR) Program.[53] The purpose was to establish a battle command benchmark from which the Army can develop competencies and enabling technologies to meet Force XXI requirements. It attempted to correlate what battle commanders do, what the Army trains them to do, and what research in battle command competencies and technology is doing to assist them. Findings from the program indicated that commanders have significant deficiencies in the battle command competencies, their management of the flow of information and how they impart battle command upon their subordinates.[54]

The following areas represent deficiencies noted during the BCFR program that clearly demonstrate areas where a battle command system could assist commanders.

- COA development and the Intelligence Preparation of the Battlefield (IPB) process
- Enemy COA development and order of battle
- Dynamic Battlefield visualization
- The TDMP
- Synchronization of the BOS, especially Field Artillery, Air Defense Artillery, and Mobility/Countermobility
- Articulation of a shared vision and commander's intent
- Management of key information requirements, such as the CCIR
- Horizontal and vertical information flows

Most of these deficiencies coincide with the TRADOC definition's characteristics. The preceding chapter of the monograph addresses shared vision, BOS synchronization, and information flow. Therefore, results of the BCFR program further reinforce and validate the analysis of battle command characteristics.

VII. Battle Command System Criteria Summary

The analysis of the battle command concept suggests that the TRADOC definition highlights some of the key characteristics. Additional analysis shows that the battle command concept goes far beyond this definition. A review of the Army's Battle Command Focused Rotation program clearly shows the need to aid commanders in several specific areas. An information-age battle command system must provide the commander with current situational awareness so that he knows when to make a decision. It must aid the commander in the decision-making process. This includes the ability to visualize a desired future state. Conceptualizing the endstate, the commander must then develop a COA that will achieve the desired future state based on knowledge

of the current situation. Inherent in the COA is the assignment of missions, prioritization and allocation of resources, and the selection of the critical time and place. Then he must promulgate a vision that his subordinates will share. This shared vision incorporates the mission (task, purpose, and end state) of each subordinate organization. Moreover, the concept of shared vision must occur at each level of command and among supporting commands that represent the BOS elements. Finally, when all the BOS elements interact horizontally, the commander can effectively synchronize everything in his battle space.

The integration of all these characteristics provides an adequate set of criteria from which to properly evaluate the objective battle command system. Having previously discussed each and explored their potential influence on the system, the author presents the following the battle command system criteria:

- Visualize The Current State
- Know How And When To Make Adjustments To The Current Fight
- Manage information flow
- Track the CCIR
- Visualize The Desired Future State
- Decide How To Get From One To The Other
- Assign Missions
- Synchronize the BOS
- Prioritize And Allocating Resources
- Select The Critical Time And Place To Act
- Develop CCIR
- Rapidly Communicate a Shared Vision of the Future Battle Space
- Seamless Interaction between the Battlefield Operating Systems
- Lead From The Front

Armed with a good set of evaluation tools, the study turns to a discussion of the emerging Army Battle Command System.

VIII. The Army Battle Command System (ABCS)

> Within the demands of the modern battlefield is the need to rapidly evolve from a process-oriented control system within a tightly structured and linear battlefield framework to a commander-oriented method of commanding forces where commanders and smaller staffs have rapid access to information and intelligence when they need it from wherever they choose to be on the battlefield.[55]
>
> Franks, "Full-Dimension Operations"

With the key characteristics of battle command identified, the focus shifts to the command system the Army is developing to support it. The analysis emphasizes the current version of the objective system. While the most useful analysis would focus on the objective version of the system, this is not possible due to the Army's developmental approach.[56] The monograph will attempt to compare the current version with the derived characteristics of battle command to suggest improvements for subsequent experiments.

The Army Battle Command System (ABCS) will represent a "migration of all fielded and developmental Army command and control systems into one fully integrated and interoperable system with seamless connectivity from the NCA to the foxhole."[57] The Force XXI concept emphasizes an ABCS that can receive all sources of battlefield information and integrate it into a digitizes image. This image will depict a unit's battle space. A collection of these unit battle space images will then form a battle space framework based on shared real-time situational awareness between the various units. The total interconnectivity will give commanders a common, relevant picture (RCP) of the battle space. The envisioned ABCS will link leaders vertically, like the normal chain of command. It will also link leaders horizontally. In this way, combat, combat support,

and combat service support leaders will "for the first time, have a means to visualize how they will execute in harmony, integrated by a shared vision of the battle space."[58]

Through the integration of all other C^2 systems, ABCS will link tactical, operational, and strategic headquarters within a common operating environment. ABCS will accomplish with three components. The Force XXI Battle Command Brigade-and-Below (FBCB2) System will provide C^2 at the lowest tactical levels. The Army Tactical Command and Control System (ATCCS) will meet the C^2 needs from brigade to corps. The Army Global Command and Control System (AGCCS) will provide connectivity between Army corps and below systems and joint and multinational C^2 systems.[59]

The tactical commander's primary interface with the ABCS is the Maneuver Control System (MCS). MCS is one of the ATCCS components. The objective of MCS is to automate C^2 support to allow the commander to make decisions more rapidly based on near real-time sharing of information.[60] As the commander's primary system, MCS provides the tactical RCP, decision aides, overlays, and graphics capabilities along with an interface with various databases that all BOS elements develop and maintain.[61]

The Army has used the MCS in some of its Army Warfighting Experiments (AWE). For example, the Army designated the Prairie Warrior (PW) exercises in 1995 and 1996 as AWEs. In these, Maneuver Control System/Phoenix (MCS/P) served as both a maneuver control system and as the surrogate ABCS that linked all the ATCCS components.[62] Using MCS/P as the surrogate ABCS represented an interim step to a seamless ABCS. The other ATCCS components were independently developed BOS specific systems. These systems included: the Advanced Field Artillery Tactical Data

System (AFATDS); the All Source Analysis System (ASAS), Warrior; the Forward Area Air Defense Command, Control and Intelligence (FAADC^{2}I) System; the Terrain Evaluation Module/Obstacle Planning System (TEMOPS); and the Combat Service Support Control System (CSSCS).[63]

IX. System Evaluation

During the PW95 and 96 AWEs, the principal unit that used MCS/P was the Mobile Strike Force (MSF). This was a notional division-size force staffed by selected students from the Army Command and General Staff Officer Course (CGSOC). It represented a unit the Army could theoretically field by the year 2010. During PW96, the MSF staff tested the hypothesis that the extent of horizontal and vertical integration of the ATCCS systems, including MCS/P, directly relates to tactical success.[64] The system used in each AWE was the newest version of MCS/P and its related software.

Analysis from the MSF's use of MCS/P provides a vehicle to examine the implications of technology, organization, and equipment on Force XXI battle command.[65] MCS/P represents the Army's latest attempt to automate much of the tactical decision-making process, increase situational awareness, and to increase tempo. To accomplish this MCS/P development focuses on three basic tenets: see the terrain; see the enemy; and see friendly forces.[66] Therefore, MCS/P will assist the commander and his staff as a maneuver planning, execution, and control system. It is in this role that MCS/P should provide the tools to allow a commander to better exercise battle command. Using primarily the results from PW 95 and PW96, the monograph will evaluate MCS/P against the battle command criteria developed previously.

Visualize The Current State

MCS/P helps the commander visualize the current state by providing access to the RCP of the battle space. The base image of this picture is a digital map with the unit's operational overlay. The battle staff, in coordination with subordinate and supporting elements, adds friendly and enemy unit icons to this base. The icons represent a wealth of information stored in friendly and enemy order of battle (OB) databases. For example, the bottom left corner of the icon represents the units current location. The commander can access this information by clicking on the unit icon. This activates the database where the commander can view items such as the unit's current logistical status report. Other software tools, such as a line of sight indicator, further aid the commander in his assessment of unit capabilities within the battle space.[67]

Relying on the digital links between friendly units, the system software updates most of the information contained in the databases periodically. For example, as a unit expends ammunition, the system tracks the expenditure and reports it in the unit's logistical status report database. The system updates combat strength the same way. This greatly reduces the time spent on these types of actions.

MCS/P receives enemy information in a different manner. ASAS, the intelligence component of ATCCS, collates information on the enemy. Analysts interpret this information and input it into the enemy OB database. Thus, the enemy portion of the RCP is a combination of actual reports and interpretations by intelligence analysts.

Simply stated, MCS/P automates many of the functions a commander and his staff perform to track an operation. However, during both PW95 and 96, both friendly

and enemy force tracking lagged significantly. Frequently, the location information in the OB databases was at least 30 minutes old. Given the time it took the staff to piece together all the information and send out the newest version of the RCP, the picture was at least an hour old.[68]

Visualize The Desired Future State

The commander and staff can use MCS/P capabilities similar to those used to create the RCP to construct an overlay to represent the desired future state. Using available tools, the commander can depict his forces and the enemy on the terrain as he envisions them at the endstate. The commander and staff can then develop estimates and COAs that will achieve this desired state.

As part of the COA development, the staff can also develop an overlay like the RCP to visually display a decision support template (DST). Based on a projected enemy situation, the DST graphically identifies where the commander will most likely make a decision.[69] The DST supports the CCIR. In combination, the RCP, the DST and "endstate" RCP help the commander to know how and when to make adjustments to the current fight.

However, MCS/P does not currently contain the appropriate set of working tools that support automating most of decision-making process. Almost without exception, the tools currently resident in MCS/P that would aid the commander and staff in this process either do not work or deviate from current approaches. For example, during both PW95 and 96, the MCS/P COA development tools and the operations order (OPORD) generation tool failed to

work.[70] As a result, the staffs either improvised or reverted back to manual processes. The PW96 MSF staff wrote their OPORD and all subsequent orders using a separate word processing program. They developed COAs and wargamed them on a paper map.[71]

While deviations from current approaches are not always bad, some MCS/P tools do not provide the intended results. For example, the synchronization matrix tool does not replicate the synchronization matrix the Army currently uses. The synchronization matrix tool is linked to the wargame tool. It only allows the calculation of the relative force ratios between specified units during a single engagement. This makes it difficult to track the remaining capability of units as they conduct multiple engagements during a battle. Additionally, it is very difficult to set up and run the number of individual engagements required during a battle using both of these tools.[72] As a result, the PW96 MSF staff members performed COA development and wargaming manually using a paper synchronization matrix.

As stated above, the MSF demonstrated the ability to increase battle space situational awareness using MCS/P. Increased situational awareness led to a higher operational tempo, when required. However, the MSF commanders could not take full advantage of this because MCS/P lacked working decision-making and planning tools. This often resulted in unplanned reactions rather than actions planned by the commander and staff to gain and maintain the initiative.[73]

Results are similar in other AWEs. OPERATION DESERT HAMMER VI provides a good example. In this operation, a digitized brigade task force fought simulated battles against a realistic opposing force (OPFOR) at the National Training Center. Though the OPFOR lacked comparable information technology, it defeated the digitize force in virtually every battle. The digitized force had, in the opinion of the head brigade observer/controller (OC), possibly the best picture of the battlefield in the history of warfare. However, poor wargaming, synchronization, and rehearsal negated any advantage.[74]

These experiment results suggest that without automated planning tools, increased situational awareness does not, in and of itself, allow the commander to control the tempo of operations. At best, he may gain temporary control of the tempo during the battle. This makes it difficult to select the critical time and place to act. Additionally, if the commander cannot gain and maintain the initiative, then he will not achieve the desired future state exactly as he envisioned. The further the actual endstate is from that originally planned, the harder it is to continually plan for subsequent operations.

Communicate Rapidly a Shared Vision of the Future Battle Space

While MCS/P may not provide automated means that support rapid decision-making, it can provide the commander several ways to communicate a shared vision with subordinate and supporting units. During PW95, an enhancement to MCS/P included the "white board" concept. Using a common map background (white board) and a light pen during an audio teleconference, the MSF commander, his staff, and subordinates conducted planning conferences and rehearsals.[75] This allowed the commander to

present his intent or vision of a future operation and receive immediate feedback. In this case, technology allowed the commander to both verbally and visually articulate the military art that automated systems cannot replicate.

While MCS/P did not have this capability during PW96, the staffs did produce operational overlays on MCS/P during both AWEs. MCS/P then transmitted these overlays digitally. This reduced planning time and eliminated reproduction and associated errors. The MSF staff still used primarily a manual decision-making process to develop the concept of the operation and associated operational overlays. However, quicker dissemination of these control measures accompanied by the commander's intent facilitated faster execution. After the operation began, the PW96 MSF commander, or the staff acting on his authority, issued follow-on orders in this manner.[76]

Seamless Interaction between the Battlefield Operating Systems

Several factors contribute to less than seamless interaction between the BOS elements. As the findings of the BCFR program show, commanders find it difficult to synchronize actions using current C^2 methods. MCS/P does not make this task significantly easier. The independently developed BOS components of the ATCCS do not share a common operating environment. PW96 represents the first time that the five ATCCS components even operated together using standard US Message Text Format.[77] Transmission of other formats remains beyond current capabilities.

As stated above, improved situational awareness without automated decision aids could lead to unplanned reactions. Unplanned reactions do not necessarily promote seamless interaction. This is especially true in large hierarchical organizations such as

the divisions in today's Army. Many of these systems, such as Patriot and the Multiple Launch Rocket System (MLRS), must operate dispersed because the represent a valuable target to the enemy. It could take several hours to simply position an attack helicopter battalion and several MLRS launchers with adequate air defense coverage for an operation. An unplanned reaction with these valuable systems invites great risk.

Lead From The Front

MCS/P does provide the capability for the commander to move about the battlefield. Results from PW95 suggest that a distributed staff can maintain the RCP sufficiently to allow the commander to move about the battlefield and not feel tied to a command post.[78] During PW96, the commander and intelligence officer both operated from a command vehicle mockup using a laptop version of MCS/P. The commander often issued orders without meeting face to face with his staff or subordinate elements.[79]

Overall Assessment and Recommendations

The evaluation of MCS/P against the developed battle command criteria provides a glimpse at both its potential and its shortcomings. MCS/P, or its successor, has the potential to greatly increase a commander's situational awareness while he freely moves about the battlefield. This type of system can potentially provide the commander with a tremendous amount of information in a few minutes by simply clicking on unit icons and reviewing databases. A commander might sit through briefings for an hour or more to receive the same amount of information today. The quicker the commander sees and understands the situation, the faster he will develop his vision of the future endstate that meets the overall purpose of the operation.

The interconnectivity also makes the dissemination of orders faster. Innovative techniques, such as a distributed discussion via a teleconference between a commander and his subordinates using a white board and a map display provide a more rapid communication of this vision. It also fosters a greater sense of shared vision, as the commander and all his subordinates can discuss the operation and see the part each plays without everyone traveling to one central location. The automation of these processes will allow the commander to gain and maintain the initiative. He can then control the tempo of the operation.

The Army has improved already the interconnectivity of the various ATCCS components. It must continue development until all BOS systems link together seamlessly. Until this occurs, a commander will never approach full situational awareness of even friendly forces. Seamless connectivity will also provide greater enemy situational awareness. Each BOS element obtains potentially some information about the enemy. Through seamless connectivity, military analysts will receive this information and provide the commander with a comprehensive picture of the threat.

Even with improved situational awareness, the commander may not make decisions noticeably faster due to the still predominantly manual decision-making process. Even worse, the enhanced situational awareness could lead to unplanned reactions. The Prairie Warrior AWEs suggest the difficulty in automating the Army's decision-making process. As noted above, the current version of MCS/P planning tools are complex and difficult to use. They do not adequately produce the desired result.

The simple automation of a process may not represent the optimal way to both improve and speed up the process. For example, word processing software is not superior to a typewriter because it simply lets you see the document before you print it. It is superior because you can see your mistakes before you print. The software quickly moves parts of the text around without retyping it. It will check the spelling and grammar in the document and suggest alternatives. These activities represent quantum leaps over the typewriter.

As it continues development of the objective ABCS, the Army should consider alternative methods and processes. An understanding of what MCS/P does poorly suggests areas for examination. You begin this analysis with the separation of the tasks that require the application of military art versus those that represent science. Arguably the most difficult decision a commander makes is the selection of the COA. The development of COAs is mainly art. The selection of a COA is more science. Can units achieve what the COA has asked them to do? How can you synchronize their actions in time and space to achieve a synergistic effect? Today, the Army uses a manual wargaming process that is very subjective.[80] The MCS/P wargaming tool is no less subjective. The operator inputs the units he wants to participate in each engagement. While he may believe that they could actually participate, he does not know for certain. The tool then simply calculates the ratio of friendly to enemy. While you can achieve a much higher degree of objectivity with either the MCS/P automated approach or the current manual wargame, it is too time consuming. The Army should investigate an automated wargame tool within MCS/P that replicates combat situations. Commercial

wargame software abounds. While most do not meet the Army's needs, software developers can probably develop a better solution. Again, simply automating manual methods does not always improve the process.

The publication of an Army OPORD or plan is another area for consideration. MCS/P does offer an OPORD generation tool. This tool did not work for PW95 or 96. But, that is not important. Eventually, the developer will make it to work. What is important is the fact that it will then generate a written document similar to what the Army uses today. It may certainly generate it faster, but the end result is the same. Leaders must then read the order and develop the mental images required to execute it. The Army should investigate ways to better replicate these images. For example, the main body of the OPORD is the concept of the operation. It tells the story of how the commander wants to fight the battle. However, important parts of the story are not told chronologically, as you would read a simple story. Instead, it lists a particular unit and the tasks it must perform. Imagine reading a chapter of what one character did, then the next chapter is what another character did. Would you buy such a book? While this is an oversimplification, it demonstrates that an OPORD makes it difficult to understand the interaction of units during an operation.

The Army should investigate a virtual OPORD generation tool instead of an OPORD generation tool that produces a written document,. For example, if the Army can develop the automated wargame, then the staff could use the wargame from the selected COA to record a video or virtual OPORD. Units could see the mission tasked to them as well as that of the units around them. The commander or the staff could also

provide narratation. In the interim, the Army could investigate using as series of overlays generated on MCS/P that contain friendly and enemy icons. Instead of developing only one overlay that represents the endstate, multiple overlays could represent the major phases in an operation. Similarly, the current RCP with additional items attached could replicate paragraph one of the OPORD. This paragraph provides information on the enemy and other friendly units' current situation.

X. Conclusions

Battle command is not a new concept. It has and will continue to represent the expression of the commander's will. However, the current environment and predictions about the future, will place greater demands on commanders than ever before. Operations will be greater in scope, intensity, and tempo due to the lethality, range, and precision of modern weapons and the accuracy and timeliness of information systems and sensors. The complex environment makes the commander's ability to gain and maintain situational awareness extremely important. The Army's emerging Force XXI doctrinal concepts recognize this fact. As a result, the Army is developing a battle command system that focuses on leveraging technology to integrate its battlefield operating systems and provide the commander with a relevant, common picture of his battle space. Experiments with MCS/P demonstrate that the Army's adoption of information technology can increase situational awareness. Further, these experiments show that when shared situational awareness increases a unit's combat power increases.[81] With further experimentation, the Army will likely solve problems remaining in this area.

Within this complex environment, battle command will also require the ability to use both centralized and decentralized methods of control. Commanders must not only see the battle space, but make and then communicate decisions faster to influence actions within it. By making decisions more rapidly, commanders will control the tempo of operations. Clearly, the Army must leverage information technology to magnify the effects of battle command execution and allow it to keep pace with changes in the environment surrounding it.

However, problems associated with the automation of planning and decision-making tools appear more significant. While automation can ordinarily solve analytical problems, the art of planning and decision-making proves difficult. The analysis in the monograph suggests the Army has experienced problems for two reasons. First, the Army's approach emphasizes situational awareness. For example, MCS/P development focuses on three basic tenets: see the terrain; see the enemy; and see friendly forces.[82] Like the TRADOC battle command definition, the focus neglects the promulgation of a shared vision and the seamless integration of those who execute the vision for the commander. This study suggests that the Army should change the battle command definition and place more emphasis on decision-making and on promulgating a shared vision. A change in emphasis may raise the priority of decision-making support tool development. Second, the Army has approached this area from the symmetrical perspective. Instead of simply automating the manual processes as the Army has done, the Army should investigate asymmetrical solutions that produce the intended result, but

in a more graphical manner. As long as the basic decision-making process remains sound, it should not matter what form the products take.

In conclusion, the monograph demonstrates that information technology can improve a commander's ability to exercise battle command. It also explains why commanders will need it. However, the Army has not had rapid success in this area. As it continues with the Force XXI process, the Army needs to continue to ask questions such as the one posed in the monograph. The Army must also continue to investigate new and innovative ways to adopt information technology.

ENDNOTES

[1] Martin van Creveld, Command in War. (Cambridge: Harvard University Press, 1985), p. 261.

[2] The Army Enterprise Strategy, (Washington DC: Office of the Secretary of the Army, 20 July 1993), p. 1.

[3] US Army Field Manual 100-5, Operations. (Washington, DC: HQ Department of the Army 1993), p. 1-1.

[4] GEN Gordon R. Sullivan, introduction to US Army, United States Army Training and Doctrine Command Pamphlet 525-5, Force XXI Operations: A Concept for the Evolution of Full-Dimensional Operations for the Strategic Army of the Early Twenty-First Century. (Fort Monroe, Virginia: U.S. Government Printing Office 1 August 1994)

[5] GEN Frederick M. Franks, "Full Dimensional Operations: A Doctrine for an Era of Change," Military Review, 73, No. 12 (Dec 93) p. 6.

[6] van Creveld, p. 263. van Creveld approaches the study of command in the same. Specifically, he notes that the individual characteristics of motivation, in both the leader and subordinate, do affect command.

[7] Franks, "Full Dimensional Operations: A Doctrine for an Era of Change," p 5. The author has taken the five factors outlined in GEN Franks' assessment. However, GEN Franks did not go into as much detail as the author in explaining the influences currently acting within the factors.

[8] TRADOC Pam 525-5, p. 1-5.

[9] van Creveld, p. 6.

[10] US Army, United States Army Training and Doctrine Command Pamphlet 525-200-1, Battle Command. (Fort Monroe, Virginia: U.S. Government Printing Office, 1 December 1994), p.3.

[11] TRADOC Pam 525-5, p. 3-1.

[12] TRADOC Pam 525-5, p. 3-1.

[13] TRADOC Pam 525-5, pp. 3-3 to 3-15.

[14] TRADOC Pam 525-5, preface.

[15] The author developed this figure to aid in understanding the linkages discussed in Chapter 3 of TRADOC Pam 525-5 where the ideas represented in the figure are discussed.

[16] FM 100-5, pp. 2-9 to 2-10.

[17] GEN Frederick M. Franks, "Battle Command: A Commander's Perspective." Military Review, 76, No. 3 (May-June 96), p. 5.

[18] TRADOC Pam 525-5, p. Glossary 1.

[19] TRADOC Pam 525-5, pp. 3-8 to 3-10.

[20] US Army, United States Army Training and Doctrine Command Pamphlet 525-200-4, Mounted Battlespace. (Fort Monroe, Virginia: U.S. Government Printing Office, 1 December 1994) pp. 2-3.

[21] LTG Paul E. Funk, "Battle Space: A Commander's Tool on the Future Battlefield." Military Review, 73, No. 12 (December 93), p. 36.

[22] US Army. United States Army Training and Doctrine Command Pamphlet 525-70. Battlefield Visualization Concept. (Fort Monroe, Virginia: U.S. Government Printing Office, 1 October 1995) p.2.

[23] US Army, United States Army Training and Doctrine Command Pamphlet 525-200-5. Depth and Simultaneous Attack. (Fort Monroe, Virginia: U.S. Government Printing Office, 1 June 1994) foreword.

[24] US Army, United States Army Training and Doctrine Command Pamphlet 525-200-5. Early Entry Lethality and Survivability. (Fort Monroe, Virginia: U.S. Government Printing Office, 1 March 1994) pp. 2-4.

[25] US Army, United States Army Training and Doctrine Command Pamphlet 525-200-6. Combat Service Support. (Fort Monroe, Virginia: U.S. Government Printing Office, 1 March 1994) p. 3.

[26] TRADOC Pam 525-5, p. 3-7.

[27] TRADOC Pam 525-200-1, p.3.

[28] TRADOC Pam 525-200-1, p.3.

[29] TRADOC Pam 525-70, p. 2.

[30] TRADOC Pam 525-5, glossary-7.

[31] TRADOC Pam 525-70, pp. 2-3.

[32] TRADOC Pam 525-200-1, p.7.

[33] The Battle Command Battle Laboratory, The Battle Command Techniques and Procedures: A Commander's Guide for the Coordination and Employment of Battlefield Operating Systems. (Fort Leavenworth, KS, 1995), pp. 2-32 to 2-33.

[34] General William E. DePuy, "11 Men 1 Mind," in Selected Papers of General William E. DePuy. (Fort Leavenworth, Kansas: Combat Studies Institute, U.S. Army Command and General Staff College, 1994), p. 17.

[35] US Army Field Manual 71-100, Division Operations. (Washington, DC: HQ Department of the Army, 1996), p. 3-1.

[36] C4I Division, Headquarters, U.S. Marine Corps, Command and Control. (Alexandria, Virginia: HQ U.S. Marine Corps, 1995), pp. 23-26. In this paragraph, the author attempts to summarize the Marine Corps' discussion.

[37] US Army Field Manual 101-5 (Final Draft), Operational Terms and Graphics (Washington, DC: HQ Department of the Army, July 1996), p. 1-66.

[38] C4I Division, Headquarters, U.S. Marine Corps, Command and Control, pp. 55-56. The author acknowledges that the title and part of the idea behind a spectrum of command and control comes from this Marine Corps document. However, MAJ David Lemelin's concept of the "Centralization Continuum" is also similar, although this author does not totally agree with Lemelin. See his monograph, Command and Control: A Sliding Scale of Centralization. (Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, June 1996), pp. 3-4. Both of these sources are also similar to Simpkin's theories referenced below.

[39] Richard E. Simpkin, Race to the Swift (London: Brassey's Defence Publishers, 1985), pp. 228-232. The author developed the spectrum of command model as a simplified version of Simpkin's parameters of command. Simpkin asserts that current realities make his model more cigar-shaped that spherical and that an army's main choice is simply the degree of control.

[40] Richard E. Simpkin, Human Factors in Mechanized Warfare (Oxford: Brassey's Publishers Limited, 1983), p. 149. Simpkin describes four different levels of centralized control. From most centralized to least, he lists them as detailed- order, forward command, mission-type, and directive.

[41] TRADOC Pam 525-5, p. 3-7.

[42] TRADOC Pam 525-200-1, p.3.

[43] Simpkin, Human Factors in Mechanized Warfare, p. 150.

[44] FM 100-5, p. 2-6.

[45] TRADOC Pam 525-5, p. 1-5.

[46] Simpkin, Race to the Swift, p. 229.

[47] C4I Division, Headquarters, U.S. Marine Corps, Command and Control, pp. 55-56.

[48] Huba Wass de Czege, "Mobile Strike Force: A 2010 Potential Force," Military Review, 76, No. 4 (Jul-Aug 96), p. . This type of example can also be found in US Army Student Text 71-100-2010, Mobile Strike Force 2010 Concept of Operations. (Fort Leavenworth, Kansas: United States Army Command and General Staff College, 20 December 1995), which BG (Ret.) Wass de Czege authored. This conceptual doctrinal

manual was used during PW96 to test other emerging doctrinal concepts, such as battle command.

[49] DePuy, p. 19.

[50] To bound his study in the development of Command in War, van Creveld states, "I am dealing with command as a process that makes use of information in order to coordinate people and things toward the accomplishment of their missions." He neglects other aspects of leadership such as motivation because of individual differences between leaders.

[51] TRADOC Pam 525-5, p. 3-4.

[52] Franks, "Battle Command: A Commander's Perspective," pp. 4-7.

[53] BCBL, The Battle Command Techniques and Procedures, p. 1-1. This booklet provided a good summary description of the BCFR program.

[54] BCBL, pp. 1-4 to 1-5.

[55] Franks, "Full-Dimensional Operations: A Doctrine for an Era of Change," p. 8.

[56] Army Digitization Master Plan '96, (Washington, DC: HQ Department of the Army, 1996) p. 8. The Army is using a rolling baseline approach to develop the ABCS and MCS. This concept uses the data gained from one experiment to establish the baseline for the next. It is an evolutionary process that builds primarily from the bottom up. For example, the initial experiments focus on FBCB2 and MCS.

[57] TRADOC Pam 525-5, glossary 1.

[58] TRADOC Pam 525-5, p. 3-4.

[59] Army Digitization Office, Executive Summary, p. 7.

[60] Maneuver Control System Operational Requirements Document, 23 May 1995, executive summary, p. 1.

[61] Capstone Requirements Document (CRD) for the Army Battle Command System (ABCS), p. 3.

[62] Colonel Rolland A. Dessert, "Mobile Strike Force: An Experiment in Future Battle Command." Military Review, 76, No. 4 (July-August 96), pp. 38-39. COL Dessert discusses the history of the MSF and MCS/P. He also discusses the linkages with the other ATCCS to develop battlefield visualization.

[63] COL Patrick Lamar, LTC Billy J. McCollum, LTC John A. Collier, and MAJ Edwin J. Kuster, Jr., "Battle Command Battle Laboratories: Where Tomorrow's Victories Begin," Military Review, 76, No. 3 (May-June 96), p. 59.

[64] COL Thomas E. Brown, Jr., "PW 96: Insights and Observations," Military Review, 76, No. 4 (July-August 96), p. 13.

[65] Dessert, "Mobile Strike Force:: An Experiment in Future Battle Command," p. 34.

[66] Lamar, et al., "Battle Command Battle Laboratories: Where Tomorrow's Victories Begin," p. 60.

[67] The author served as the current operations officer for the MSF during PW96. Much of the information presented about MCS/P comes from the author's personal experience with the system. Where it is available, the author supplements this experience with reports and articles about the exercises.

[68] Louis G. Bornman, Michael C. Ingram, and MAJ Peter J. Martin, Information Technology in the Digitized Division. (Fort Leavenworth, Kansas: TRADOC Analysis Center, November 1995) p. 10. The author's experience in PW96 coincided with that reported here.

[69] FM 101-5-1 (Final Draft), Operational Terms and Graphics. (HQ, Department of the Army) p. 1-81.

[70] Bornman, et al., pp. 11-12.

[71] Author's personal experience in PW96.

[72] Bornman, et al., pp. 11-12.

[73] BG(R) Huba Wass de Czege, "Prairie Warrior 95 Initial Impressions Report, Executive Summary." (Fort Leavenworth, Kansas: Joint Venture Combined Arms Assessment Team, 1 October 1995) p. 2.

[74] LTC Harry G. Simmeth, Jr., Fighting the Digitized Force: Operation Circuit Breaker Vs. Operation Desert Hammer VI. (Carlisle Barracks, PA: U.S. Army War College, May 1995) pp. 73-74.

[75] Bornman, et al., p. 8.

[76] Author's personal experience as the current operations officer for the PW96 MSF. Typically, either the commander or the staff would anticipate the need to change from the current plan. Following the commander's basic intent the current operations staff would huddle and develop a scheme of maneuver. They would then prepare an operations overlay and brief the scheme to the commander, who, once he approved it, would then brief the scheme and his intent to subordinates over the radio or telephone. Fragmentary orders were prepared later, mainly for administrative purposes.

[77] Dessert, p. 38.

[78] US Army Operational Test and Evaluation Command, PRAIRIE WARRIOR/Mobile Strike Force 5 Advanced Warfighting Experiment Assessment. (Alexandria, VA: Operational Test and Evaluation Command, 12 June 1995) Appendix A: Battle Command Issues, p. 2.

[79] Author's personal experience, see notes above.

[80] Student Text 101-5, Command and Staff Decision Processes, (Fort Leavenworth, Kansas: US Army Command and General Staff College) chapters 3& 4. These chapters

describe how the Army conducts the manual wargame to select COAs. The author's description of the MCS/P wargaming tool is based on personal experience using it.

[81] Wass de Czege, "Mobile Strike Force: A 2010 Potential Force," p.70-71.

[82] Lamar, et al., "Battle Command Battle Laboratories: Where Tomorrow's Victories Begin," p. 60.

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